Application # 09/758,573
Submitted February 16, 2005
Reply to Office Action of August 16, 2004

I.   REMARKS/ARGUMENTS

2. The Office Action dated August 16, 2004 has been carefully considered.

Reconsideration of this application, in view of the following remarks, is respectfully requested.

A.   References

3. The following U.S. patents were considered in the office action:

*   US Patent 6,592,629 ("Cullen"), filed November 13, 1997.

*   US Patent 6,651,113 ("Grimsrud"), Filed December 22, 1999

*   US Patent 4,550,437 ("Kobayashi"), Filed June 17, 1982

*   US Patent 5,959,639 ("Wada"), Filed August 12, 1996

*   US Patent 6,338,119 ("Anderson"), Filed March 31, 1999

B.   Overview of Office Action

4. The office action:

a.   rejected claims 1, 5-9, 11-18, 22, 23, 26, 27, 30-34 as being obvious in light of Grimsrud in view of Kobayashi, under 35 U.S.C. 103(a) and

b.   rejected claims 2-4 as being obvious in light of Grimsrud and Kobayashi in further view of Wada or Anderson under 35 U.S.C. 103(a) and

c.   rejected claims 19-21, 24, 25, 28, 29 as being obvious in light of Grimsrud and Kobayashi in further in view of Cullen under 35 U.S.C. 103(a).

C.   Terminology

5. In reviewing the prior art, it is clear that some terms are used differently or have multiple meanings. In the following section, I will c

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a.   Buffer

6. The term buffer has at least two distinct meanings in computer science. The first meaning is "The use of a special area in memory to hold data temporarily for processing until a program or operating system is ready to deal with it", and the second meaning is "An area of storage that is used to hold data to be passed between devices that are not synchronized or have different bit transfer rates."[1] The second meaning is directed to a buffer, in particular in an I/O device, that accepts information at one rate and delivers it at another.[2]

7. The term "buffer" as used in the present claims is the first meaning as opposed to the second, namely, in the context of this application, buffer means "a special area in main memory used to hold data temporarily for processing by a CPU".

b.   I/O RAM

8. The term "I/O RAM" as used in the context of this application means "a random access memory which is associated with an I/O device, and which is distinct from main memory".

c.   memory

9. The term "memory" as used in the context of this application means "main memory which is distinct from an I/O RAM, a CPU cache, or an external cache". Thus, the phrase "memory is cached" refers to main memory which is subject to caching operations in which a copy of the data in main memory is automatically copied to the cache.

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[1] See "buffer storage" in *Microsoft Dictionary of Computing*, fourth edition, 1999.

[2] See "buffer" in Merriam Webster's Collegiate Dictionary, tenth edition, 1996.

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d.   memory copy function

10. The term "memory copy function" as used in the context of this application means "a computer program that copies a block data between a memory address and another memory address".

D.   Prior Art Combinations

11. The Office Action relies on combinations of Grimsrud and Kobayashi, in further view of Wada or Anderson, or in further view of Cullen.

E.   Reliance on Grimsrud

12. Grimsrud is directed to a method of "writing data on an optical storage medium" (Grimsrud 1:8-9). More specifically, Grimsrud teaches using a portion of main memory (20) in the role of an optical device buffer (20) to avoid buffer underrun while burning an optical storage medium, such as a CD-R. The motivation is not to increase performance but to reduce "the cost and complexity the drive" for the optical device (see Grimsrud3:50-60).

13. The office action cites Grimsrud 3:4-7 which states "The data source 14 may be any known data storage device, such as a hard disk, a tape drive, another optical storage device, an internet connection, a satellite receiver, and the like." However, this single sentence does not teach the limitations of claimed invention. Grimsrud does not teach "method of increasing image processing performance" because it is directed toward burning CD-R's not increasing any kind of image processing performance. Further, Grimsrud does not teach "explicitly copying a first instance of an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory prior to performing CPU intensive operations on the data copied from said image, wherein the CPU access is made directly to the extra second copy of the

data in memory and not to the first instance in said I/O RAM" because it doesn't teach explicit

copying of "a first instance of an image", "a second copy of said image", nor "performing CPU

intensive operations on the data copied from said image."

F.   Reliance on Kobayashi

14.   Kobayashi is directed to "an apparatus for parallelly processing local image

data." (Kobayashi 1: 5-6). Specifically, Kobayashi teaches "an image data processing apparatus

2" which contains a plurality of processor units (20) each with its own data memory (21). For

example, if the specialized image data processing apparatus (2) were processing images that

were 480 rows by 640 columns, the apparatus would have 640 processor units and 640 data

memories, one for each column. Each processor unit is designed to be implemented as a separate

integrated circuit (IC).

15.   Because Grimsrud does not teach that I/O memory is a RAM, the office

action relies on Kobayashi to teach the missing I/O RAM, and cites Kobayashi 2:41-46 "The

image information or data stored in the image memory 3 is processes by an image data

processing apparatus 2, the result of the processing is again stored in the image memory 3 and/or

supplied to a supervising processor 1 for controlling the whole system." However, Kobayashi

does not disclose a convention computer architecture, it is not clear if its "image memory 3" is

I/O RAM. Every time RAM is mentioned by Kobayashi it is not if reference to "image memory

3" but in reference to one of the embodiments of data memory (21), namely RAM 440 in Fig 6A,

RAM 51 in Fig 7A, and RAM 61 in Fig 8A. Thus, there is no teaching in Kobayashi that image

memory 3 is a RAM. Therefore, Kobayashi does not teach what the office action relies on it for

teaching.

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G.   Combination of Grimsrud and Kobayashi is Improper

16. The combination of Grimsrud and Kobayashi is improper because it is an unsuggested combination. The prior art references do not contain any suggestion (express or implied) that they be combined, or that they be combined in the manner suggested. Grimsrud is directed towards avoid CD-R buffer underun and Kobayashi is directed toward a specialized parallel image processor.

17. Further, even if Grimsrud and Kobayashi were combined, the combination would fail to teach the claimed invention. The combination would still lack "explicitly copying a first instance of an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory prior to performing CPU intensive operations on the data copied from said image, wherein the CPU access is made directly to the extra second copy of the data in memory and not to the first instance in said I/O RAM" because it doesn't teach explicit copying of "a first instance of an image", "a second copy of said image", nor "performing CPU intensive operations on the data copied from said image."

H.   Reliance on Wada

18. Wada is directed to a method and apparatus "a computer graphics apparatus for carrying out computer-aided digital image processing and displaying the result of the processing on a raster scan display." (Wada 1:6-9)

19. The office action relies on Wada to teach L1 and L2 cache, but fails cite any specific part of Wada.

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I.   Reliance on Anderson

20. Anderson is directed to a method of "data processing systems and in particular to processing systems which pre-fetch data from a main memory and one or more cache memories." (Anderson 1:7-10)

21. The office action relies on Wada to teach L1 (104) and L2 (106) cache, but fails cite any specific figure or specification text.

J.   Combination of Grimsrud, Kobayashi, and Wada or Anderson is Improper

22. The combination of Grimsrud, Kobayashi, Wada and Anderson is improper because it is an unsuggested combination. The prior art references do not contain any suggestion (express or implied) that they be combined, or that they be combined in the manner suggested. Further, because the references each solve a different problem and are individually complete there would be no reason to combine the references.

23. As discussed above, even if Grimsrud and Kobayashi were combined, the combination would still lack the features of the claims. The further combination of either Wada or Anderson, would not supply the missing elements.

K.   Reliance on Cullen

24. Cullen is directed to a method of "a document management system" (Cullen 1:12-13)

25. The Office Action cites Cullen 5:16-63 for its reliance on teaching compression, decompression, encryption, and decryptions. However, the teaching of Cullen are at a high level and do not teach the specifics of CPU processing of an image in memory or an I/O RAM.

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26. Further, because the references each solve a different problem and are individually complete there would be no reason to combine the references.

27. As discussed above, even if Grimsrud and Kobayashi were combined, the combination would still lack the features of the claims. The further combination of either Wada or Anderson, would not supply the missing elements.

L.   Combination of Grimsrud, Kobayashi and Cullen is Improper

28. Combination of Grimsrud, Kobayashi and Cullen is improper because it is an unsuggested combination. The prior art references do not contain any suggestion (express or implied) that they be combined, or that they be combined in the manner suggested.

M.   Overview of the Present Invention

29. The present invention is relates to image processing, specifically the explicit "copying a first instance of an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory prior to performing CPU intensive operations on the data copied from said image, wherein the CPU access is made directly to the extra second copy of the data in memory and not to the first instance in said I/O RAM" (e.g. see claim 1). The present invention includes methods and machines which increase image processing performance by efficiently copying image data from input memory to main memory before performing CPU intensive operations, such as image enhancement, compression, or encryption, and by efficiently copying image data from main memory to output memory after performing CPU intensive operations, such as decryption, decompression, image enhancement, or reformatting.

30. As explained in the specification the use of I/O RAM and memories with caching were known. The automatic copying of data from main memory to a level 1 or level 2

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cache is not the copying-claimed by this invention. As stated in the abstract, this invention is ⋯ ⋯⋯ ⋯ directed to explicit "copying image data from input memory to main memory before performing CPU intensive operations, such as image enhancement, compression, or encryption" and "copying image data from main memory to output memory after performing CPU intensive operations, such as decryption, decompression, image enhancement, or reformatting". As stated in the "Not Obvious" section starting on page 8 of the specification, "speed improvement yielded by this invention was not obvious to one skilled in the art of computer programming" because the making of an *extra second* copy of the data would have been considered to be overhead and adverse to performance.

II.   CLAIM REJECTIONS UNDER 35 U.S.C. 103(A)

31.   The office action rejected claims 1, 5-9, 11-18, 22, 23, 26, 27, 30-34 as being obvious in light of Grimsrud in view of Kobayashi, under 35 U.S.C. 103(a).

A.   Claims 1, 5-9, 11-18, 22, 23, 26, 27, 30-34 Not Rendered Obvious by Grimsrud and Kobayashi

32.   Independent claim 1 requires "explicitly copying a first instance of an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory prior to performing CPU intensive operations on the data copied from said image, wherein the CPU access is made directly to the extra second copy of the data in memory and not to the first instance in said I/O RAM". As discussed above, neither Grimsrud nor Kobayashi teach or suggest all of the required elements. This fundamental element of the claimed invention is entirely lacking in Grimsrud, Kobayashi, and their combination.

33.   Independent claim 12 requires "explicitly storing the processed results of CPU intensive operations in a first instance of a buffer in memory prior to copying the processed

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data into a distinct second copy of the processed data in an image in an I/O RAM, wherein the

CPU results are written directly to the first instance of the processed data in memory and not to

the distinct second copy in said I/O RAM.". As discussed above, neither Grimsrud nor

Kobayashi teach or suggest all of the required elements. This fundamental element of the

claimed invention is entirely lacking in Grimsrud, Kobayashi, and their combination.

34. Independent claim 16 requires "a means for copying image data between said

memory and said I/O device, wherein said image data is copied from said I/O device to a second

copy of said image data in a buffer in said memory prior to being processed by said processor or

wherein said processor processes said image data using a buffer in said memory before copying

the processed image data from said memory to said I/O device". As discussed above, neither

Grimsrud nor Kobayashi teach or suggest all of the required elements. This fundamental

element of the claimed invention is entirely lacking in Grimsrud, Kobayashi, and their

combination.

35. Independent claim 22 requires "a means for copying said image data from

said input device to a second copy of said image data in a buffer in said memory prior to being

processed by said processor, whereby image processing time is reduced compared to the image

processing time required if the processor processed the first copy of the image data in the input

device." As discussed above, neither Grimsrud nor Kobayashi teach or suggest all of the

required elements. This fundamental element of the claimed invention is entirely lacking in

Grimsrud, Kobayashi, and their combination.

36. Independent claim 26 requires "a means for copying, after said processor

generates a first set of image data in said memory, said first set of image data from said memory

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to a second copy of said image data in said output device, whereby image processing time is

reduced compared to the image processing time required if the processor generated the image

data directly in said input device instead of said memory." As discussed above, neither

Grimsrud nor Kobayashi teach or suggest all of the required elements. This fundamental

element of the claimed invention is entirely lacking in Grimsrud, Kobayashi, and their

combination.

37. Thus, neither Grimsrud, Kobayashi nor their combination, suggest the

required elements of the claimed invention. Further, Kobayashi teaches using specialized

parallel processing to improve image processing performance; in this regard Kobayashi teaches

away from copying image data to main memory from I/O (or visa versa) to improve image

processing. Thus, neither Grimsrud, nor Kobayashi, nor their combination, renders the claims

obvious.

38. Claims 5, 11, 13-15, 17-18, 23, 27 and 30 are dependent on claims 1, 12, 16,

22, 26, respectively, for all the reasons above are patentable over the combination of Grimsrud

and Kobayashi.

**B.   Claims 6-9 and 31-34 Not Rendered Obvious by Grimsrud and
         Kobayashi.**

39.   The office action rejected claims 6-9 and 31-34 as being obvious in light of

Grimsrud in further view of Kobayashi under 35 U.S.C. 103(a).

40. Claims 6-9 and 31-34 are dependent on claims 1, 12, 16, 22, 26, respectively,

for all the reasons above are patentable over the combination of Grimsrud and Kobayashi.

41. Claims 6-9 and 31-34 require a "a memory copy function", "a single call to

said memory copy function", "a subset of said image data is copied one line at a time by repeated

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calls to said memory copy function", "subset of said image data is copied by repeated calls to said memory copy function". Neither Grimsrud nor Kobayashi teach these missing elements. The office action provides not basis for adding these elements to the combined teaching

42. The references do not suggest the required elements of the claimed invention. Thus, neither Grimsrud, Kobayashi, nor their combination, render the claims obvious.

C.   Claims 2-4 Not Rendered Obvious by Grimsrud, Kobayashi, Wada or Anderson.

43.   The office action rejected claims 2-4 as being obvious in light of Grimsrud and Kobayashi in further view of Wada or Anderson under 35 U.S.C. 103(a).

44. Claims 2-4 are dependent on claim 1, and for all the reasons above are patentable over Grimsrud, Kobayashi, and Wada or Anderson.

45. Further, claims 2-4 further require a "memory" that "is cached", that "is cached in a CPU cache", or that is "cached in an external cache". As discussed above, the term memory in these claims refers to main memory, which is distinct from the other claim elements of "a CPU cache" and "an external cache". Claims 2-4 still require all of the elements of claim 1 including "explicitly copying a first instance of an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory prior to performing CPU intensive operations on the data copied from said image, wherein the CPU access is made directly to the extra second copy of the data in memory and not to the first instance in said I/O RAM". Thus, automatic copying of image data from memory to a cache does not remove the claimed limitation of "explicitly copying" between main memory and I/O RAM.

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D.   Claims 19-21, 24, 25, 28, and 29 Not Rendered Obvious by Grimsrud, Kobayashi or Cullen

46.   The office action rejected claims 19-21, 24, 25, 28, and 29 as being obvious in light of Grimsrud and Kobayashi in further view of Cullen under 35 U.S.C. 103(a).

47.   Claims 19-21, 24,25,28, and 29 are dependent on claims 1, 12, 16, 22, 26, respectively, for all the reasons above are patentable over the combination of Grimsrud, Kobayasi, and Cullen

48.   The office action appears to be rejecting claim 21 based on claim 16's rejection rationale. However claim 21 is not dependent on claim 16, and claim 21 includes additional limitations that the office action failed to address. Claims 24 and 25, likewise are dependent on claim 22, rather than claim 16. And, claims 28 and 29 are dependent on claim 26, rather than 16.

49.   Further as discussed above, the combination of Grimsrud and Kobayashi fail to suggest many of the required claim elements. Thus, Grimsrud, Kobayashi and Cullen do not render the claims obvious.

E.   Claim 21 Not Rendered Obvious by Grimsrud, Kobayashi, or Cullen

50.   The office action rejected claim 21 as being obvious in light of Grimsrud and Kobayashi in further view of Cullen under 35 U.S.C. 103(a).

51.   Claim 21 is dependent on claims 1 and 12, and respectively, for all the reasons above is patentable over the combination of Grimsrud, Kobayasi, and Cullen.

52.   Claim 21 requires "a network of machines" with the limitations of claims 1 and 12 "wherein a video signal is digitized and encoded" and "transmitted across said network". Neither Grimsrud, Kobayashi, nor Cullen teach these limitations. Neither Grimsrud nor

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Kobayashi suggest the elements required by independent claims 1 and 12. Further, Cullen does

not suggest that a "video signal is digitized and encoded" or that the video signal "is transmitted

across [the] network". This fundamental element of the claimed invention is entirely lacking in

Grimsrud, Kobayashi, or Cullen and their combination. For this reason alone, claim 21 should

now be allowed.

F.   Reconsideration Requested

53. The undersigned respectfully submits that, in view of the foregoing remarks,

the rejections of the claims raised in the Office Action have been fully addressed and overcome,

and the present application is believed to be in condition for allowance. It is respectfully

requested that this application be reconsidered, that these claims be allowed, and that this case be

passed to issue. If it is believed that a telephone conversation would expedite the prosecution of

the present application, or clarify matters with regard to its allowance, the Examiner is invited to

call the undersigned inventor at 408-739-9517.

Respectfully submitted,

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